

## ON GEOMETRICAL STAIRCASES.

The principle on which geometrical stairs are constructed is, that any body must rest in equilibrium that is supported on three points, and although the support of each step is not beneath its centre, the step cannot nevertheless change its position so long as its attachment to the wall prevents it from tilting.

The cross section of a step of a stone geometrical stair is triangular, so that each step is a right-angled stone prism, of which the one corner forms the nosing of the step, and the other two corners are joggled to the steps above and beneath them: the plane of the tread is continued to about an inch from the surface of each riser, and the other line of the joint runs perpendicularly to the line or angle of the stair.

The thickness required to give the necessary strength to stone steps varies, of course, with the kind of stone employed; but, as a general rule, steps of 1 foot long may be made 2 inches thick at the thinnest place, and half an inch of additional thickness may be allowed at the interior angle for every additional foot of length.

Where geometrical staircases are made of wood, it appears to be the best plan to arrange them as if stone were the material, and on the continent this is generally done, but the quantity of wood required is an objection to this method where wood is scarce, and in this country it is the usual practice to make all wooden staircases out of boards, whether geometrical or otherwise. When made in this manner the treads and risers should not be less than 1½ inch thick when the length of the step is 4 feet, and it is usual to allow a quarter of an inch of additional thickness for every foot of additional length. The risers should be dovetailed in to the covers, and the treads should be fixed to the risers by screws put in from beneath the stair.

Cast iron geometrical stairs are now much used in some situations, and there is every probability that their use will greatly extend; they combine lightness with durability and strength.

There is one leading principle common to all stairs, which, since I have touched upon the subject, I may here set down. That a stair may be agreeable in its use, the breadth and height of the step must have a fixed proportion to each other, the breadth of the step being increased as its height is diminished. A step of 12 inches broad is usually made 3½ inches high, and this is found to be a convenient proportion, and a rule may be formed from this example which will be found to agree tolerably near with other cases in practice:  $12 \times 3 = 36$ , which, if taken for a constant numerator, will give 2½, or 6½ths for the height of a step 10 inches wide, which is about the usual proportion.

Blondel affects greater refinement in the settlement of this question, and gives a formula, deduced by means of the principles of maxima and minima for determining the relative proportions of risers and treads. Let  $x$  equal the space over which a person walks on a plane, and  $z$  the height to which he could with the same ease ascend vertically, then, if  $h$  equal the height of the step, and  $w$  its width.

$$h = z \sqrt{1 - \frac{w}{x}}$$

The question, however, is one of practical convenience, and is not to be determined by scientific considerations, though science may represent the proportions experience has ascertained. The length of a man's step is a definite quantity; if he steps up he cannot at the same time step equally out, and therefore the breadth of the tread has to be diminished as its height is increased.

G. J. R.

**WARWICK LUNATIC ASYLUM.**—A plan for this building by Mr. Harria (to whom, in conjunction with Mr. G. Godwin, as our readers will remember, the second premium for the Middlesex Asylum was recently awarded) has been adopted. It provides for 300 patients, and is capable of extension. The estimated cost is 45,859*l.*, exclusive of gas, the chaplain's house, farm buildings, and the architect's commission. These additions would increase the amount to about 50,000*l.*

## THE FRENCH ARCHITECTS' REPRESENTATIVE IN THE NATIONAL ASSEMBLY.

On the 26th ult. a large number of architects met in Paris, at the Ecole des Beaux-Arts, to select a candidate to present for election as one of the national representatives. A senior member of the profession was at first desired, and Messrs. Labrousse, Blouet, and Duban were severally invited to stand, but these having declined, M. César Daly, recently mentioned by us as the editor of the *Revue Generale de l'Architecture*, was proposed, and a ballot being taken, received 244 votes out of 365, and will accordingly be sent to the poll. M. Hector Horeau, another architect, is a candidate to represent the department of Seine-et-Oise. He sets forth in his address the works he has produced as an architect, his travels, and the fact that by means of his education alone, without fortune, he has been able to create for himself an honourable position,—as grounds on which to claim their support.

## ROYAL INSTITUTE OF ARCHITECTS.

At a meeting, on the 3rd inst., Mr. C. Fowler in the chair, Herr Boisserée was elected corresponding member, and Mr. Penrose was elected fellow. Mr. R. W. Billings read a paper, "On the Ancient Architecture of Scotland." After stating the earliest remains of construction in Scotland to consist of one or two Roman bridges and earthworks of stations, some Druidical remains of considerable extent, and the Picts' houses resembling beehives in form, Mr. Billings mentioned that the first recognizable style of importance in that country was the Norman; and he pointed out the similarity of style in the architecture of that period in Scotland to that of the north of England. The transition to "Early English" and "Early Decorated" took place in the two countries almost simultaneously; but at the end of the thirteenth century—when the dispute for the Scotch crown caused the severance of the two kingdoms—a striking difference became visible between their styles of architecture. This became the more marked as the alliance which had then sprung up between Scotland and France grew stronger. From that time forward the architecture of Scotland has borne the impress of her ally; and the ancient and modern houses and hotels of Edinburgh of the present day resemble very much those of the French capital. It is also to be remarked, that during the period last alluded to (the latter end of the decorated period), there existed a considerable affinity between the ecclesiastical and domestic architecture in Scotland:—for instance, the hanging tracery of Roslyn Chapel is found also in the courtyard of Linlithgow Palace, and at Stirling. The "four-centred" arch is not to be found in Scotland,—the circular arch is used at all periods; and from these circumstances the form of the arch, so important an element with us in ascertaining dates, is in that country no guide for the purpose. The writer alluded to the immense strength of the fortresses previously to the introduction of powder; and said that when experience proved that no lengthened resistance could be opposed to that terrific power, the picturesque semi-castellated architecture was introduced,—a style as peculiar to Scotland as the perpendicular or the Elizabethan is to England. The custom of having a small circular loop-hole under each window in the private dwelling-houses was particularly alluded to. The Reformation and the zeal of the followers of John Knox swept away a large portion of the interesting buildings of Scotland; but the real spoliators, he remarked, were the town authorities. Their example was followed by the lower classes,—who in their turn regarded the ruins as "quarries" for obtaining materials; and in the present day railway works are equally destructive to many of the most interesting ruins in the kingdom. Mr. Billings expressed a strong opinion that some official means should be taken to prevent this destruction. In the time of Charles the First the revival of Italian architecture and its mixture with the Gothic produced the picturesque effect so remarkable in the buildings of that period. Heriot's Hospital, Wintown House, and Glasgow College, were especially instanced.

## RECOVERY OF COST OF PARTY-WALLS.

SHERIFFS' COURT—MONDAY.  
CARTER v. MAY.

THIS was an action to recover the sum of 7*l.* 17*s.* for work and labour done in erecting a party-wall. The plaintiff, a bricklayer, had been employed by Mr. Rydon to erect some premises in Gresham-street, City, and had proceeded up to the first-floor joists, when, as plaintiff deposed, Mr. Pullen, defendant's surveyor (defendant was a builder, and the owner of the adjoining property), said that in consequence of an alteration being about to be made by him in the rate of the house adjoining, it would be necessary that the party-wall should be built half a brick thicker. Plaintiff said that he would not do so unless Mr. May would undertake to see him paid, which was agreed to. All this, however, was positively denied by Mr. Pullen, who said he was only acting under the powers of the Act of Parliament, and went on the premises which were being built to see that the party-wall, &c., was properly erected. The plaintiff replied that he told defendant and Mr. Pullen that his contract was different from what was proposed, and he would not work except it was distinctly understood defendant was to pay him for the work, and on the faith of that understanding he went on with the work, and did not speak to Mr. Rydon on the subject.

Mr. Duncan, counsel for the defendant, submitted that, under the Buildings Act, the plaintiff could not recover, as, by a certain section of the Act, the building owner and the adjoining owner were bound on dispute to have a reference. The building owner, in which position Mr. Rydon stood, had the power of doing all necessary work; and the building owner was bound to deliver an account within twenty-one days, and had the power of recovery from the adjoining owner. The counsel contended that the Act of Parliament was imperative on this point—that the builder was to be considered the "owner," for the purposes of this Act generally, and that no inferior tradesman under the contract could recover for work necessary to be done in compliance of the Act, but the expense of which was to be borne and paid by the "adjoining owner." He had, however, a higher ground to rest his case upon, which was, that the defendant was bound to pay the building owner, Mr. Rydon, and had done so. The judge was clearly of opinion that the Act was imperative, and that the plaintiff must be non-suited.

## CLEANSING HOUSE DRAINS AND SEWERS.

SIR,—That the cleansing of the house-drains and sewers of the metropolis or large towns, depending for supplies of water upon an intermittent system through the agency of pipes, should be effected by the appropriation of a portion of such supply, can scarcely be denied, but appears the readiest and most natural means of attaining the desired end.

It happens, however, in all cases where this system obtains, that the mode of the application and disposal of water supply is such, as to leave the house-drains most frequently uncleaned, even where a good natural fall is taken advantage of and a good plan of drainage as regards the form and size of the channels adopted. The mere allusion to the disadvantage of a bad fall and an injudicious system of drainage, will be sufficiently convincing of the utter impossibility of a thorough cleansing under such circumstances. A little reflection upon the present system of water supply in the metropolis for domestic uses, and the mode of its disposal afterwards, will serve to shew how inefficient it must be for cleansing purposes as regards the drains and sewers.

By the present arrangement, the water in its passage from the house and cisterns into the drains, becomes necessarily charged with impurities more or less dense, and its emissions being in small quantities and destitute of force or power in the discharge, the denser substances most frequently become deposited in the drains, accumulating and indurating at the bottoms, decomposing and forming the source of fetid odours, generating malaria and its evil consequences.

It is an undoubted fact, ascertained by the experiments of practical men, shewn in the evidence before the Sanitary Commissioners,